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*Published in:*  
Cancer

*DOI:*  
[10.1002/cncr.21691](https://doi.org/10.1002/cncr.21691)

**IMPORTANT NOTE:** You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

*Document Version*  
Publisher's PDF, also known as Version of record

*Publication date:*  
2006

[Link to publication in University of Groningen/UMCG research database](#)

*Citation for published version (APA):*

Visser, A., Huizinga, GA., Hoekstra, HJ., van der Graaf, WTA., & Hoekstra-Weebers, JEHM. (2006). Parental cancer - Characteristics of parents as predictors for child functioning. *Cancer*, 106(5), 1178-1187. <https://doi.org/10.1002/cncr.21691>

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# Parental Cancer

## *Characteristics of Parents as Predictors for Child Functioning*

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Supported in part by the Dutch Cancer Society (Grant number RUG 2000–2333).

The authors thank Ineke Bakker for her contribution to data collection, the families for participating, and the physicians and nurses of the University Medical Center Groningen for their contribution to patient recruitment.

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Received April 15, 2005; revision received September 7, 2005; accepted September 22, 2005.

**BACKGROUND.** The vulnerability of children when a parent is diagnosed with cancer may depend on a variety of variables. The current study examined the impact of characteristics of 180 parents diagnosed with cancer, along with 145 spouses, on the prevalence of emotional and behavioral problems in children.

**METHODS.** Ill parents provided information on sociodemographics and illness-related variables and on the prevalence of problems in children by using the Child Behavior Checklist (CBCL). Both parents completed the two subscales that measure physical functioning and mental health of the RAND-36.

**RESULTS.** The family situation (single parents, no or few siblings, oldest child) was one of the most important predictors of reported problems in primary school children, whereas adolescents were reported as having more problems when parents experienced treatment complications. A decrease in ill parents' physical functioning affected primary school daughters and adolescents, and both age groups were affected by the mental health of ill parents. Problems of ill fathers did not have a different impact on children from those of ill mothers. Spouses' physical limitations were indicative for problems in primary school children, whereas a worsening parental mental health was indicative for problems in adolescents.

**CONCLUSIONS.** Findings illustrated that parents' characteristics must be taken into account when assessing vulnerability of children in this situation. Which variables particularly heighten the risk for problems depend on children's ages. *Cancer* 2006;106:1178–87. © 2006 American Cancer Society.

**KEYWORDS:** parental cancer, child problems, sociodemographics, illness-related variables, parent's functioning

Cancer not only affects the patient, but the experience also encroaches deeply on family life. Research in recent decades has focused increasingly on the role of the partner in such situations. Researchers have also paid increasing attention to the impact that a diagnosis of cancer in a parent has on the children, although the results of these studies are ambiguous. A review study described that some studies reported more emotional problems in children, whereas others found similar problems in comparable norm groups.<sup>1</sup> In addition, a recent study has established that 21% of adolescent sons and 35% of adolescent daughters in such families experience serious stress response symptoms.<sup>2</sup> Which children are particularly vulnerable remains unclear.

First, few studies have investigated the influence that sociodemographic characteristics of the parent have on the functioning of children in such situations. The majority of these studies focused on children of mothers who have been diagnosed with cancer. Furthermore, these studies have made no distinction between ill fathers and ill mothers. Whether the impact of having a mother with cancer

differs from that of having a father with cancer is, therefore, unclear. We still know little about the influence of family socioeconomic status (SES) in such situations. Research on the general population has shown, however, that lower SES increases risk for problems in children.<sup>3,4</sup> Children from single-parent families and only children generally tend to be more vulnerable than children from two-parent families or families with more children.<sup>5,6</sup> It is possible that this vulnerability increases even further when a parent has cancer. Children in such families often have more responsibilities and fewer family members with whom they can share their concerns.<sup>7-9</sup>

Research results concerning the influence of characteristics of the disease are also contradictory. Previous studies argued that the diagnostic phase, period of treatment, and deterioration from the disease were especially difficult times for children.<sup>7,10</sup> Another study among chronically ill parents asserted that not illness-related variables, but rather the effects these variables had on parents' functioning affected the prevalence of problems in children.<sup>11</sup> Studies of parents with chronic somatic illnesses have shown that children tend to have more problems when the physical functioning of the parent is worse.<sup>12</sup> The extent to which the physical functioning of parents with cancer influences children is not known. The few studies that have considered the psychological functioning of parents with cancer have yielded inconsistent results. One study found more problems in the parent-child relationship when parents experienced mental problems.<sup>13</sup> Another study found that the mental health of parents had no impact on child functioning.<sup>14</sup> Differences in methodology (e.g., a focus on only mothers or on both parents, the type of and time since diagnosis, use of different informants) in these studies might have caused these differences. Furthermore, the literature among the general population suggests that the functioning of mothers has a different impact on children than the functioning of fathers.<sup>15</sup> It has also been suggested that the functioning of parents may have different effects on sons versus daughters.<sup>16,17</sup> For example, mothers' psychological distress was found to be positively related to depressive disorders in daughters, whereas it was negatively related to educational attainment in sons.<sup>18</sup>

The importance of a well functioning parent to the well being of the children increases in families in which a parent has cancer. The well functioning parent can ensure that daily life continues to be as normal as possible and can provide emotional support for the children. The increased number of tasks and responsibilities expected of the partner combines with the anxiety and concern for the parent who is ill, placing a

particularly heavy burden on the partner. Little research has been conducted concerning the impact that the health of the partner can have on children in such situations. A metaanalysis of the impact of psychopathology among parents on the functioning of their children did show that the risk of problems for the children further increases when both parents are ill.<sup>15</sup>

Additional clarity is needed on the influence of various characteristics of parents who have been diagnosed with cancer, as well as the influence of their partners, on the prevalence of problems in children. The goal of the present study was to examine the impact of ill parents' demographics, illness-related variables, as well as physical and mental functioning, on the prevalence of emotional and behavioral problems in children. The current study also examines whether the physical functioning and mental functioning of spouses contributed to the prediction of reported problems in children over and above ill parents' characteristics.

## MATERIALS AND METHODS

### Sample

The physician or oncology nurse introduced the study by offering written information to all eligible patients consecutively hospitalized or visiting the outpatient clinic for treatment or regular check up at the University Medical Center Groningen between January 2001 and February 2003. Patients were eligible if diagnosed with cancer between 1-5 years before study entry. Children had to be in the age range of 4-18 years and residing with the ill parent at the time of diagnosis. After informed consent was obtained, according to the regulations of the Medical Ethics Committee of the University Medical Center Groningen, questionnaires and prepaid return envelopes were sent to the families.

The total number of families informed of the study was 476. Of these, 271 families did not agree to participate (response rate, 43%). Nineteen families were excluded from analyses because the children were >18 years of age while participating in the study. The sample was 180 parents diagnosed with cancer and 145 spouses. Ill parents reported on 114 primary-school age and 222 adolescent children. Information on sociodemographic and illness-related variables are displayed in Table 1.

The main reasons for parents declining to participate were that parents or children were too emotionally distressed; they did not want to stir up emotions again; parents expected that the effects of cancer on the children would be small, so consequently children were not informed by them; or parents mentioned

**TABLE 1**  
**Sociodemographics and Illness-Related Variables**

	N	%
Ill parents' characteristics		
Fathers	34	19
Mothers	146	81
Mean age = 44.3 yrs (SD = 5.1, range = 32.8–57.8 yrs)		
Partner (Yes)	167	93
Number of children in a family		
1 child	28	16
2 children	90	50
3 children	45	25
≥ 4 children	17	9
Highest educational level completed		
Primary school or lower vocational level	54	30
Lower general secondary education	28	16
Secondary vocational education	43	24
Higher general secondary or preuniversity education	18	10
Professional education or university degree	37	20
Illness-related variables		
Type of cancer		
Breast	92	51
Gynecologic	22	12
Dermatologic	19	11
Hematologic	16	9
Soft tissue/bone	10	6
Urologic	8	4
Gastrointestinal	4	2
Others	9	5
Time since diagnosis		
Mean = 2.7 yrs, SD = 1.2		
Treatment modality		
Nonintensive	30	17
Intensive	150	83
Recurrence (Yes)	35	19
Complications (Yes)	33	19
Participating spouses		
Fathers	113	78
Mothers	32	22
Mean age = 44.8 yrs (SD = 7.3, range = 31.3–65.6 yrs)		
Children of participants		
Primary school children		
Sons	59	52
Daughters	55	48
Mean age = 8.8 yrs (SD = 2.1, range 4–11 yrs)		
Position in the family		
Only child	8	7
Youngest	59	52
Middle	10	9
Oldest	37	33
Adolescent children		
Sons	105	47
Daughters	117	53
Mean age = 15.5 yrs (SD = 2.0, range 12–18 yrs)		
Position in the family		
Only child	20	9
Youngest	79	36
Middle	40	18
Oldest	83	37

that other affairs needed attention (such as school, work, or illness of others). Parents who participated in the study did not differ significantly in gender, type of diagnosis, and time since diagnosis from those who declined.

## Instruments

### Sociodemographics

Parents provided information on age, gender, highest educational level completed, marital status, number of children, and position of the child in the family, as well as on age and gender of each child.

### Illness-related variables

Information was obtained from parents on length of time since diagnosis, treatment modalities received, experience of recurrent disease, and complications of treatment experienced.

### General health-related quality of life (QOL) of parents

Ill parents and spouses completed the subscales physical functioning (10 items) and mental health (5 items) of the RAND-36 (a variant of the SF-36 of Ware & Sherbourne<sup>19,20</sup>). The physical functioning scale contains questions about daily activities, such as walking a kilometer, stair climbing, and housekeeping. Mental health was measured with questions about depressive feelings and nervousness. Scores were transformed following the prescribed formula and ranged from 0 to 100. Higher scores indicate better health. Good reliability and validity of the RAND-36 have been replicated for the Dutch translation.<sup>20</sup> Cronbach alphas in the present study were high on both subscales (range, 0.87–0.90).

### Emotional and behavioral functioning of children

Parents diagnosed with cancer completed the Child Behavior Checklist (CBCL) to assess emotional and behavioral functioning of children over the preceding 6 months.<sup>21,22</sup> The CBCL consists of 120 items and has 3 response options (0 = not true; 1 = somewhat or sometimes true; 2 = very true or often true). The internalizing problems, externalizing, and total behavioral problem scales were used for the present study. The internalizing problems scale (32 items) represents the internal mental state of children and measures the syndromes of withdrawal, somatic complaints, and anxiety–depression. The externalizing scale (30 items) reflects socially unacceptable behavior and measures the syndromes of delinquent and aggressive behavior. The total problem scale represents the total score derived from the sum of all items and consists of internalizing problems and externalizing scales, complemented with thought, social, and attention problems,

as well as “other” problems. Higher scores denote more problems. The reliability and validity of the CBCL has been supported in a wide number of international and national studies. In the present study, Cronbach alphas for internalizing problems, externalizing, and total problem scales ranged from 0.84 to 0.94.

### Statistical Analyses

Chi-square tests and an independent Student *t* test were computed to examine differences in demographic and illness-related variables between parents participating in the study and those that did not.

Univariate analyses were conducted to determine relations (Pearson correlation analyses) and differences (independent Student *t* test) between children’s problems and ill parents’ sociodemographics, illness-related variables, and both parents’ physical functioning and mental health. Analyses of variance (ANOVAs) were used to examine the effect of the position of the child in the family on prevalence of problems. Categories used were oldest, middle, youngest, and only child. The Games Howell procedure was used for post hoc pair-wise comparisons because of unequal sample sizes and variances. A dichotomous variable was created for treatment received by parents consisting of surgery only (“nonintensive” treatment) versus all other treatment (“intensive” treatment regimens). This classification was made based on the clinical experience of physicians who participated in this project. Duration of therapy and visible side effects of treatment were the main factors leading to this classification. It may be expected that intensive treatment regimens might have a longer duration and cause more visible side effects in parents than in cases of surgery only and, therefore, would have a more disruptive effect on family life. Complications were defined as: subjective or objective serious side effects of treatment or unexpected treatment-related events that had impact on the subsequent treatment schedule or recovery after therapy. Complications experienced were categorized as: fever and infections (36%), serious side effects of treatment (e.g., serious mucositis, 21%), hemodynamic events (12%), thrombosis (12%), postoperative bleeding (3%), neurologic events (e.g., epilepsy, 9%), and pneumothorax (6%). A dichotomous variable was created for parents who experienced treatment-related complications versus those who did not.

Hierarchic multiple regression analyses were performed to assess the relative contribution of several characteristics of parents to the prediction of problems reported in children. Only variables that were significant in univariate analyses were entered into the

model. Because of the stable nature of demographic variables, these variables were entered first. The position of the child in the family is a categorical variable and was, therefore, transformed into dummy variable(s). In regression analysis, there must be a reference category (omitted category), which is usually the largest subgroup.<sup>23</sup> In this study, that was the subgroup of youngest children. The following dummy variables were created: oldest child versus the rest; middle child versus the rest; and only child versus the rest.

The severity of illness may affect the physical functioning and mental health of parents. Therefore, illness-related variables were entered into the second step. The third step comprised variables measuring physical functioning and mental health of ill parents. The impact of ill parents’ functioning may depend on parents’ gender, and it may have a different effect for sons and daughters. Therefore, two-way-interaction terms (using standardized scores) were computed between the 2 QOL dimensions of ill parents and gender of parents and children. Only when the 2-way interaction accounted for a unique significant effect was it included in the model. The fourth step contained physical functioning and mental health of spouses.

Analyses were conducted separately for primary school (4–11 yrs) age and adolescent children (12–18 yrs) because of the cognitive and emotional developmental differences between these groups.

## RESULTS

### Univariate Analyses

#### *Sociodemographics*

The younger the ill parent, the more total problems were reported in primary school children and the more externalizing problems in adolescent children. Ill fathers and ill mothers did not significantly differ in their perceptions of children’s functioning. Educational level of ill parents was not significantly related to problems reported in primary school age and adolescent children (Table 2).

#### *Family characteristics*

Single parents and parents from smaller families reported significantly more internalizing problems, externalizing, and total problems in primary school children than those who had a partner and those who had more children. This was not found for adolescents. Analyses of variance indicated that the position of the child within the family affected the prevalence of internalizing problems and total problems in primary school and adolescent children (Table 2). However, post hoc pair-wise comparisons showed only 1 significant difference: oldest primary school children were



TABLE 2  
Relations and Differences between Ill Parents' Reported Problems in Children and Sociodemographics and Illness-Related Variables

	Ill parent			Family characteristics			Illness-related variables			
	Age	Gender	Educational level	Single/two parents	Number of children	Position	Time since diagnosis	Treatment modality	Recurrent disease (no/yes)	Complications (no/yes)
	<i>r</i>	<i>t</i>	<i>r</i>	<i>t</i>	<i>r</i>	<i>F</i>	<i>r</i>	<i>t</i>	<i>t</i>	<i>t</i>
Primary school children										
Internalizing	-.18	-0.6	.19	-6.1 <sup>b</sup>	-.30 <sup>c</sup>	4.8 <sup>b</sup>	.01	2.0 <sup>b</sup>	-0.9	0.0
Externalizing	-.16	0.1	-.10	-2.4 <sup>a</sup>	-.33 <sup>c</sup>	2.0	.05	0.5	-0.0	0.2
Total Problems	-.20 <sup>a</sup>	-0.3	.03	-5.2 <sup>c</sup>	-.37 <sup>c</sup>	3.3 <sup>a,d</sup>	.00	1.6	-0.9	0.3
Adolescents										
Internalizing	-.05	-0.7	-.02	-0.3	-.10	3.2 <sup>a,d</sup>	.01	1.2	2.2 <sup>a</sup>	3.6 <sup>c</sup>
Externalizing	-.14	-1.4	.00	-0.3	.00	1.2	.03	0.7	0.9	3.2 <sup>b</sup>
Total Problems	-.12	-1.3	.00	-0.6	-.08	3.1 <sup>a,d</sup>	.00	0.8	1.7	3.8 <sup>c</sup>

<sup>a</sup>  $P \leq 0.05$

<sup>b</sup>  $P \leq 0.01$

<sup>c</sup>  $P \leq 0.001$

<sup>d</sup> Pair-wise comparison of groups was not significant.

reported to have significantly more internalizing problems than youngest primary school children ( $P = 0.017$ ).

#### *Illness-related variables*

Time since diagnosis was not significantly related to problems reported in children. Parents who had received a more intensive treatment reported more internalizing problems in primary school children than parents who had received only surgery. Parents who had recurrent disease reported more internalizing problems in adolescent children than did parents who did not have recurrent disease. Parents suffering from treatment-related complications (such as infections) reported more internalizing problems, externalizing, and total problems in adolescent children than parents who did not experience complications (Table 2).

#### *QOL of parents*

Ill parents who experienced more physical limitations reported significantly more internalizing problems ( $r = -0.29$ ,  $P \leq 0.001$ ), externalizing ( $r = -0.17$ ,  $P = 0.014$ ) and total problems ( $r = -0.28$ ,  $P \leq 0.001$ ) in adolescents. This was not found for primary school children. A decreased mental health in ill parents was significantly associated with more internalizing problems ( $r = -0.33$ ,  $P \leq 0.001$ ;  $r = -0.27$ ,  $P \leq 0.001$ ), externalizing ( $r = -0.23$ ,  $P = 0.015$ ;  $r = -0.19$ ,  $P = 0.005$ ), and total problems ( $r = -0.29$ ,  $P = 0.003$ ;  $r = -0.27$ ,  $P \leq 0.001$ ) in primary school and adolescent children respectively.

Physical limitations experienced by spouses were significantly related to externalizing problems ill parents reported in primary school children ( $r = -0.22$ ,  $P = 0.05$ ). A decreased mental health in spouses was significantly related to internalizing problems ( $r = -0.39$ ,  $P \leq 0.001$ ), externalizing ( $r = -0.19$ ,  $P = 0.009$ ), and total problems ( $r = -0.34$ ,  $P \leq 0.001$ ) reported in adolescent children.

#### **Hierarchical Regression Analyses**

Six separate hierarchic multiple regression analyses were performed to examine the contribution of potential predictors in the explanation of internalizing problems, externalizing, and total problems reported by ill parents regarding primary school age (Table 3) and adolescent children (Table 4).

#### *Internalizing problems*

**Primary school children.** A significant percentage of the variance in reported internalizing problems was explained by demographic variables. Ill parents observed more internalizing problems in primary school children when they were the oldest child and when the ill parents were single parents. Intensity of treatment entered in the second step did not account for a significant increment in the variance explained. The mental health of ill parents entered in the third step also did not account for a significant increment in the variance explained (Table 3).

**Adolescents.** Illness-related variables explained a significant percentage of variance, but only the experience of complications had a significant independent

**TABLE 3**  
**Summary of Hierarchic Regression Analyses of Variables Predicting Ill Parents' Reports of Primary School Children's Problems**

	Internalizing problems				Externalizing problems				Total problems			
	<i>Beta</i>	<i>R</i> <sup>2</sup>	<i>R</i> <sup>2</sup> <i>Ch</i>	<i>FCh</i>	<i>B</i> <sup>d</sup>	<i>R</i> <sup>2</sup>	<i>R</i> <sup>2</sup> <i>Ch</i>	<i>FCh</i>	<i>Beta</i>	<i>R</i> <sup>2</sup>	<i>R</i> <sup>2</sup> <i>Ch</i>	<i>FCh</i>
Step 1		0.35		10.8 <sup>c</sup>		0.11		4.6*		0.31		15.2 <sup>c</sup>
Gender child	–				0.97				–			
Age parent	–				–				0.00			
Number of children	–0.14				–2.69 <sup>b</sup>				–0.26 <sup>b</sup>			
Single child vs others	0.00				–				–			
Middle child vs others	–0.05				–				–			
Oldest child vs others	–0.25 <sup>b</sup>				–				–			
One/two-parent families	–0.48 <sup>c</sup>				– <sup>e</sup>				–0.43 <sup>c</sup>			
Step 2		0.36	0.01	2.0								
Intensity treatment	–0.12				–				–			
Step 3		0.38	0.02	3.7		0.22	0.12	3.7 <sup>a</sup>		0.33	0.02	3.7 <sup>a</sup>
Physical funct	–				–2.38 <sup>a</sup>				–			
Mental health	–0.17				–1.05				–0.16			
Physical functioning × gender child	–				3.30 <sup>a</sup>				–			
Step 4						0.27	0.05	6.0 <sup>a</sup>				
Physical functioning Spouse	–				–1.37 <sup>a</sup>							

Dashes indicate that variables were not entered into the model, because no significant effects were found in univariate analyses.

<sup>a</sup>  $P \leq 0.05$

<sup>b</sup>  $P \leq 0.01$

<sup>c</sup>  $P \leq 0.001$ .

<sup>d</sup> Because of the interaction term entered in this model standardized scores were used and B's were presented instead of beta's.

<sup>e</sup> Variable is constant.

**TABLE 4**  
**Summary of Hierarchic Regression Analyses of Variables Predicting Ill Parents' Reports of Adolescents' Problems**

	Internalizing problems				Externalizing problems				Total problems			
	<i>Beta</i>	<i>R</i> <sup>2</sup>	<i>R</i> <sup>2</sup> <i>Ch</i>	<i>FCh</i>	<i>Beta</i>	<i>R</i> <sup>2</sup>	<i>R</i> <sup>2</sup> <i>Ch</i>	<i>FCh</i>	<i>Beta</i>	<i>R</i> <sup>2</sup>	<i>R</i> <sup>2</sup> <i>Ch</i>	<i>FCh</i>
Step 1						0.01		2.1				
Age parent	–				–0.11				–			
No. of children	–				–				–			
Step 2		0.05		4.5 <sup>a</sup>		0.05	0.03	5.7 <sup>a</sup>		0.05		9.2 <sup>b</sup>
Recurrent disease	0.10				–				–			
Complications	0.20 <sup>b</sup>				0.18 <sup>a</sup>				0.23 <sup>b</sup>			
Step 3		0.14	0.08	8.1 <sup>c</sup>		0.07	0.03	2.6		0.14	0.08	8.0 <sup>c</sup>
Phys. funct. parent	–0.16 <sup>a</sup>				–0.10				–0.18 <sup>a</sup>			
Mental health parent	–0.21 <sup>b</sup>				–0.12				–0.19 <sup>a</sup>			
Step 4		0.22	0.08	17.0 <sup>c</sup>		0.09	0.02	3.0		0.19	0.06	11.4 <sup>c</sup>
Mental health spouse	–0.32 <sup>c</sup>				–0.14				–0.25 <sup>c</sup>			

Dashes indicate that variables were not entered into the model, because no significant effects were found in univariate analyses.

<sup>a</sup>  $P \leq 0.05$

<sup>b</sup>  $P \leq 0.01$

<sup>c</sup>  $P \leq 0.001$

effect. Physical functioning and mental health of ill parents and mental health of spouses, included in the second and third steps, appeared to account for significant increments in explained variance of internalizing problems in adolescent children (Table 4).

Interaction terms failed to contribute significantly to the prediction of internalizing problems in primary school and adolescent children. This indicated that the impact of physical functioning and mental health of the ill parent differed neither for fathers and mothers nor for

sons and daughters. The final model accounted for 38% of the variance of problematic internalizing problems in primary school children and 22% in adolescent children.

### **Externalizing problems**

*Primary school children.* Demographic variables accounted for a significant percentage of variance explained in reported problematic externalizing. Only the number of children in a family appeared to have a significant independent negative effect. The next step showed a significant contribution to ill parents' QOL; physical functioning appeared to have a significant unique effect. A significant interaction effect for physical functioning in ill parents and the gender of primary school children was found. This indicated that a worsened physical functioning in ill parents was predictive of more externalizing in primary school daughters, whereas this was not the case for sons. The final step showed that physical functioning of spouses accounted for a significant increment in the variance explained (Table 3).

*Adolescents.* Demographic variables did not account for a significant percentage in the variance explained. The experience of complications in parents, entered in step two, had a significant and individual effect. The third step showed that physical functioning and mental health of ill parents did not predict a significant percentage of additional variance, nor did mental health of spouses entered in the fourth step. None of the interaction terms accounted for a significant contribution in adolescent's problematic externalizing (Table 4).

The variables entered into the model explained 27% of variance of externalizing in primary school age and 9% in adolescent children.

### **Total problems**

*Primary school children.* A significant percentage of variance in total problems was explained by demographic variables. Number of children in a family and having one or two parents appeared to have significant unique effects. Mental functioning of ill parents, entered into the second step, accounted for a significant increment in the variance explained, but it did not have a significant independent effect (Table 3).

*Adolescents.* Complications experienced by parents contributed significantly to the prediction of total problems. The next step showed that physical functioning and mental health of ill parents also appeared to have significant independent effects, as did mental health of spouses (Table 4).

Again, no effects were found for the interaction

terms in predicting total problems in primary school age and adolescent children. The overall model accounted for 33% of variance in total problems of primary school and 19% of adolescent children.

## **DISCUSSION**

This study is one of the first to investigate impact of parental characteristics on emotional and behavioral problems in children who have a parent diagnosed with cancer. Attention was paid to ill parents' socio-demographic and illness-related variables and to physical functioning and mental health of both parents. We used ill parents' reports for information on prevalence of problems in children. Analyses were performed for primary school age and adolescent children separately.

First, the results demonstrated that age, gender, and educational level of ill parents had no noticeable effects on problems reported in children. Information on the impact of ill parents' age and educational level on children's functioning in this situation is lacking. Studies that paid attention to parents' gender found that adolescent daughters of ill mothers experienced more problems.<sup>2,14,24</sup> The majority of ill parents in the current study were mothers (81%), which may have prevented us from finding a gender effect.

The family setting appeared to be an important predictor for problems in primary school children. Our study shows that children were reported to have more problems when living with a single parent, a finding also described previously.<sup>25</sup> Also, more problems in primary school children were reported when they were the oldest child. Children of this age are dependent on their parents in terms of daily care and attention. If a parent diagnosed with cancer is the sole caregiver or there are only younger siblings to share experiences and feelings with, the life of children may be more disrupted. Another explanation could be that single parents worry more about their children because they are the sole caregiver, and they are, therefore, more alert to disruptive behavior. Remarkably, reported problems in adolescents were not associated with family setting. Adolescents may be more capable of managing their own lives, and, in general, they have more extensive peer groups from which to receive support.<sup>26</sup>

Second, illness-related variables seemed to have an impact on problems parents reported in adolescents, whereas this was not found for primary school children. More specifically, parents who experienced complications during treatment perceived more problems in adolescent children than did parents without complications, which is in contrast to an earlier study.<sup>27</sup> The relatively small sample ( $n = 32$ ) and the



larger time since diagnosis (several mos to 16 yrs) in the above-mentioned study might have contributed to discrepancies in research findings. The vulnerability of adolescents in this situation may be caused by their empathic capabilities, which make them aware of the pain and physical discomfort parents may experience. Time since diagnosis, treatment modalities, and recurrent disease did not seem to affect problems reported in children. These findings were in accord with those of others.<sup>14,27,28</sup> Previous studies have suggested that the degree to which the child perceives the situation to be serious and stressful, and not objective characteristics of the illness itself, determine whether problems will arise.<sup>29,30</sup> Another possible explanation is that characteristics of the illness no longer play an important role 1–5 years following diagnosis. This explanation, however, is in direct contrast to the effect that was found for complications. Relatively few patients received nonintensive treatment (surgery only) or experienced relapse. It is possible that the groups were too small to reveal any significant differences.

Third, the impact on children's functioning of an ill parent's physical and mental functioning was examined. Ill parents who experienced physical limitations perceived more externalizing problems in primary school daughters (not sons). A study among a community sample also demonstrated that worsened physical functioning in the parent was a predictor for primary school children's externalizing problems.<sup>12,31</sup> However, the last study did not examine effects on sons and daughters separately. In an earlier study, we found a higher percentage of primary school daughters scoring in the clinical range on externalizing problems than the percentage found in the norm group.<sup>24</sup> It may be that daughters at this age are vulnerable to problematic externalizing, especially when the parent experiences physical limitations. Physical limitations in parents also predicted internalizing problems and total problems that were reported in adolescent children. The few studies that paid attention to the relation between a parent's physical functioning and prevalence of problems in children have also considered physical functioning as an important predictor of various problems in children.<sup>12,31</sup>

Ill parents who had a worsened mental health were more likely to report internalizing problems and total problems in their adolescent children, which replicates findings of earlier studies.<sup>32,33</sup> The current study, however, did not find a relation to externalizing problems, which is in contrast to findings from those earlier studies. One study suggested that a direct relation between a parents' depression and internalizing problems in children exist, whereas depression in combination with a conflicting environment

may heighten the risk for externalizing problems.<sup>34</sup> Perhaps the diagnosis of cancer produces a situation in which family members tend to behave in socially desirable ways, or in which family members become closer to each, rather than a situation in which conflicts tend to arise. Two factors can play a role in the relation between mental functioning of parents and problems in children. On the one hand, children could actually have more problems as a result of their exposure to depressive behavior of parents.<sup>35</sup> Conversely, mental problems on the part of the parent could also lead to a tendency to overreport problems in children.<sup>36,37</sup>

A further exploration, using interaction effects, showed that ill parents' physical and mental functioning had similar effects on sons and daughters. One exception was found, as described earlier: physical functioning of parents affected primary school daughters but not primary school sons. The current study also found no difference between the impact of the functioning of fathers on the prevention of problems in their children and that of mothers. These results were not in line with results of previous work that problems in children increased when fathers had a worsened physical functioning, whereas no relation was found for that of mothers.<sup>32</sup> Inconsistent results were also found in earlier studies concerning mental health of parents. Some studies indicated that children's functioning was equally associated with fathers' and mothers' mental functioning.<sup>31,32,38</sup> Two meta-analyses, however, indicated that problems in children (especially internalizing problems) were more strongly associated with depression in mothers than in fathers.<sup>15,39</sup> Perhaps the difference between fathers and mothers can be explained primarily by the extent to which a child is exposed to the physical and mental limitations of parents. Because, in general, mothers continue to be more involved in care of children than are fathers, the burden on children could be greater when the mother experiences limitations in functioning than when the father experiences similar limitations. Nonetheless, a reorganization of roles can occur in a situation in which one parent has cancer, thus decreasing the differences between mothers and fathers regarding the care of their children. The absence of a gender effect in such situations may also be attributable to limited participation of fathers with cancer in this study. Further insight into the impact of functioning of the parent on children could be generated by investigating this relation in the context within which it occurs. In other words, future studies should take various family factors, and the complex relations between these factors, into account.

Finally, findings support the notion that spouses' functioning had an additional effect on problems in children. These results are consistent with previous research among children of parents with cancer<sup>33</sup> and parents with psychopathology.<sup>15,35,40</sup> The impact of spouses' functioning seemed to be similar to that of ill parents: worsened physical functioning in spouses predicted externalizing problems in primary school children; spouses' mental health was associated with internalizing problems and total problems in adolescents. Confrontation with depressive behavior on the part of the partner can also increase vulnerability of adolescents in such situations. In addition, the partner can have an important role in emotional support of adolescents, even compensating for the role of the ill parent when necessary. Impaired mental health can limit the ability of the partner to fulfill this role.

Results of the study are based on a large and heterogeneous research group. In addition, it considered not only functioning of the parent who has been diagnosed with cancer but also that of the partner. The influence of the parent variables can be dependent on the developmental phase of the children. Distinctions among various age groups allow detection of such differences.

The number of single-parent families participating in the study was small. This may suggest that single parents more often decided not to participate in the study than parents who had a partner. The finding that children in single-parent families were reported to have more problems coupled with the small percentage of single-parents that participated may indicate that our results show less problems than may be present in the population of children of cancer patients.

The cross-sectional design of this study does not allow causative conclusions to be drawn. The use of a longitudinal design will give insight into the direction of statistical relations and may, therefore, do more justice to bidirectional and dynamic processes within families in this situation.<sup>35</sup> Besides, preexisting problems in children may make an important contribution to current problems in children, but this was not examined. Unfortunately, studies like this do not have the capability of assessing whether problems existed before cancer diagnosis. Furthermore, such stressful situations may cloud the parent's perception. Involving other informants, including teachers and the children themselves, could provide a more accurate image. Potential predictors of children's functioning and interactions between these factors have not received sufficient attention in the literature. Therefore, more research exploring the mechanism that may play a role in the impact parents' cancer has on children is

needed to prevent problems. Such studies should consider not only characteristics of the family and relationships among family members but also the role of social networks and age peers, particularly those of adolescents. These characteristics require more attention.

Results of this study show that the impact of cancer on children depends upon family factors and the level of functioning of both parents. The diagnosis and treatment of cancer is often an enormous burden on the parent, and it can lead to many physical and mental problems. These problems can limit the ability of parents to fulfill their parental roles. Social workers could provide support for the parent and, thus, help to balance the energy the illness demands with the care needed for children. Additional attention to this matter is needed for families in which the parent experiences treatment complications or physical or emotional problems, as well as for single-parent families. In addition, families in which the partner also has health problems require particular attention.

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